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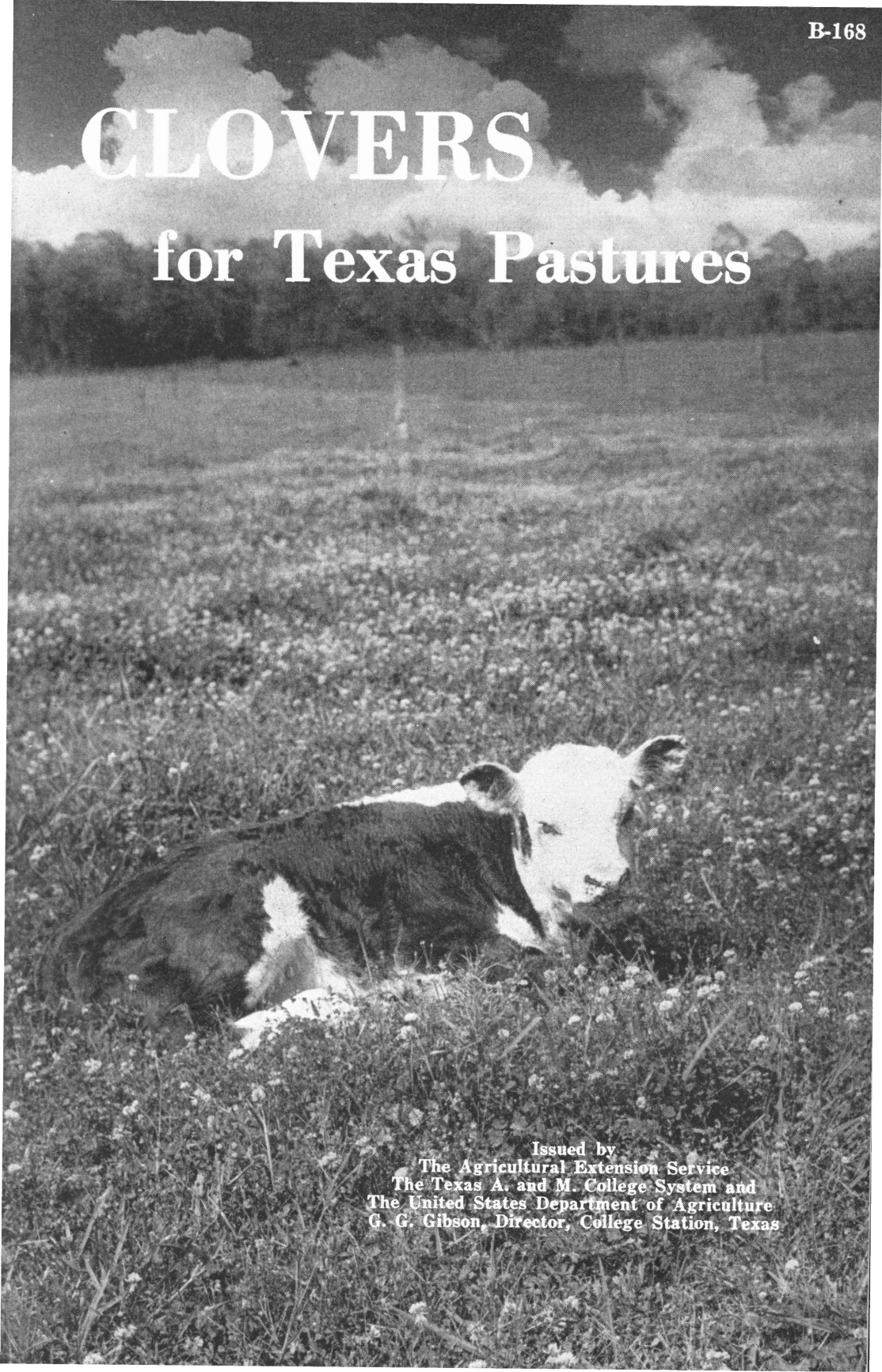
CLOVERS for Texas Pastures



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CLOVERS FOR TEXAS PASTURES

By

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Clovers are of great importance in pasture production. Grasses and clovers growing together are a desirable combination, each benefiting the other. Clovers are members of the legume family, and they have the ability to take nitrogen from the air through bacteria developed in nodules on the roots. This nitrogen in turn is supplied to the soil and becomes available to growing plants. Clovers are usually considered to have a higher feeding value than non-legumes, because of their higher protein, mineral and vitamin A and D content.

CLOVER HELPS GRASS AND GRASS HELPS CLOVER

Raw, fibrous grass roots dying annually must have extra nitrogen to balance soil fertility. Without adequate nitrogen, the annual rotting of old grass roots and regrowth of new are slow, and the grass becomes sod bound. The germs of decay require a balanced diet to live and multiply. Sodland with a legume is the best known means to restore organic matter and thus to revitalize wornout land. Forest soils, in comparison with prairie soils are lower in organic matter. Clover in southern grassland adds to the total volume of production, especially in early spring when most needed, and crowds out early annual weeds and three-awn needle grass. Increased soil nitrogen from clover stimulates earlier growth, greater yield and more protein in other vegetation associated with it.

Bonemeal feeding is not needed for livestock on well balanced pastures of growing clover and grass or clover alone, even in vegetation regions normally deficient in phospate. However, addition of phosphate to most soils is essential for high yield of clover. Clover is relatively high in phosphorus and other mineral nutrients as well as in vitamins and protein, but it is less so on poor land.

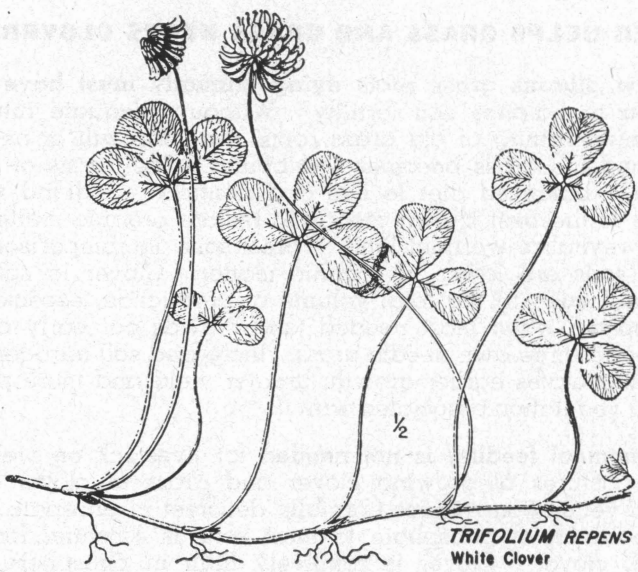
Four groups of leguminous pasture plants are called clovers in Texas. The true clovers are the genus Trifolium. In this group

are white clover, crimson clover, large hop clover, small hop clover, persian clover, and others of less importance at present. Another group or genus is Medicago including the various bur-clovers, black medic, and alfalfa. Sweetclovers are of the genus Melilotus. Lespedezas also are much like clover and common lespedeza formerly was known as Japan-clover. But little reference is made here to lespedezas.

TRUE CLOVER (TRIFOLIUM)

True clovers, such as white clover, crimson, hop clovers and persian clover, are best adapted generally to regions of more than 40 inches annual rainfall.

White clover, (Trifolium repens), known by its frost-like leaf markings and small marble-sized globular white blossoms, is a perennial in northern states spreading by creeping stems, and rooting at the joints. In Texas, known erroneously as white "Dutch" clover, it usually dies after seeding in late spring, but may continue as a perennial where fertility and moisture and



White Clover

cool weather are favorable. It is the leading pasture clover on moist fertile East Texas and Coastal low lands and rich bottoms.

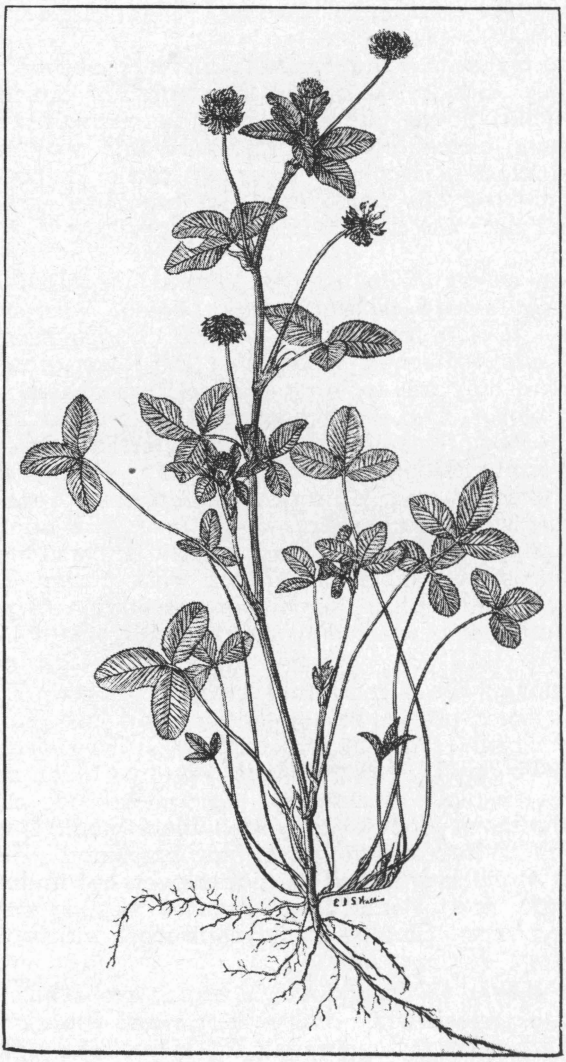
White clover is gaining on loamy hills where treated with lime and well fertilized with superphosphate, with potash added wherever needed. Northern white clover seed is not adapted to Texas. Louisiana white clover is the strain adapted in the south.

Ladino clover is a giant variety of white clover, two to four times larger. Shape, color, and leaf markings are identical to those of white clover. Its large, vigorous growth and shallow roots require almost continual moisture and very fertile soil. Where adapted, it is commonly grown alone for pasture or in pasture mixtures. Its precedence has not been established in Texas, but it may find a place in irrigated pastures.

Persian clover (Trifolium resupinatum) has light purple or lavender flat-headed blossoms and inflated, balloon-like seed envelopes. It is a true winter annual. Under-grazing favors this tall, hollow-stemmed clover over the lower-growing white clover where they are together. Close grazing lets sunlight to the white clover, and its spreading habit crowds the persian. Soil fertility requirements are lower for persian clover than for white clover but higher than for hop clovers. Persian also seems better adapted to poorly-drained depressions. Persian clover is about two weeks earlier than white clover, coming and going. The Mississippi Experiment Station reports persian clover as yielding 50 per cent more forage than white clover. This greater yield more than offset the higher percentage of phosphoric acid and protein in white clover reported by the same station.

Hop clovers are second only to white clover in East Texas. The two species are small hop clover (Trifolium dubium) and large hop clover (Trifolium procumbens). Their globular, yellow, many-flowered, blossom heads resemble black medic until the latter turns black at maturity. Seldom are hop clovers and black medic found together in Texas. Black medic is as strange to acid soils as hop clovers are to limy blackland. Hop clovers grow with white clover and persian clover but endure a little higher acidity and lower fertility. Yet they respond well to phosphate and potash. Small hop clover is most widely abundant.

Alsike clover (T. hybridum) blossoms are similar to white clover though mixed white and pink or either white or pink and without the frosted leaf marking. The stems bear flower heads along their entire length, the oldest below, the youngest at the top of the stem. It is naturally a perennial, yet in the south its habit is more that of a winter annual. Stems arise from a crown rather than from runners. It withstands more acidity and is adapted to stream bottoms or swales too wet for other clovers.



Alsike Clover

TRIFOLIUM INCARNATUM
Crimson Clover

Dixie crimson clover

Crimson clover (T. incarnatum) is not considered a permanent pasture plant, but it offers much as an erect winter annual legume alone or in small grain for temporary pasture in crop rotation, for green manuring, or for hay. The name crimson clover is derived from the bright crimson color of the spike-like seedheads. Certified seed of several varietes of reseeding crimson clover is available.

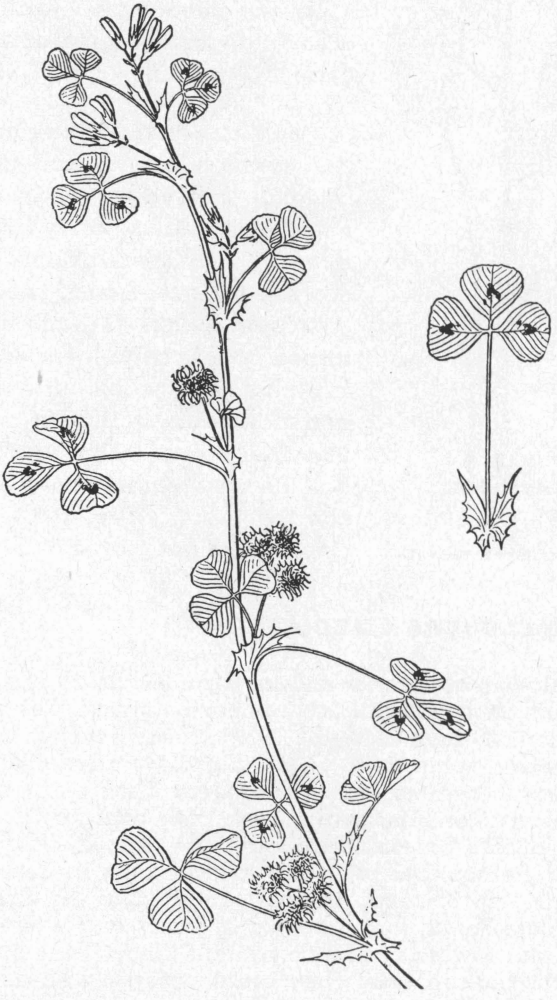
Sub clover (T. subterraneum) is a low, running annual, soft and wooly, covered with rather long soft hairs. Short seed-stalks carry clusters of three to four small creamy to pinkish flowers. The seed-head is made up of a cluster of forked hairs or bristles, turned back around the seed pod. The ripening seed-heads turn downward, and many bury in the earth somewhat like the peanut. But approximately half the seed remain above ground and can be easily harvested. The seed color is brilliant purple.

THE BUR-CLOVERS (MEDICAGO)

Bur-clovers are winter annual legumes. Small clusters of yellow flowers form at leaf bases along the stems. The spiny, coiled pods contain several seeds. Some seeds delay in germinating two years and some three years. Bur-clovers require higher soil fertility and more lime than true clovers. Their quick growth and short season offer less grazing and their overgrowth sometimes smothers grass. Unless mowed or close grazed, an over-growth increases the chances of stock bloating. Burs in fleeces are objectionable. Bur-clovers are best adapted to the Post Oak Regions of East Texas, through Central Texas and westward in fertile low land toward a 25-inch rainfall limit. They succeed better on soils high in lime. They are especially well adapted with Bermudagrass and with Johnsongrass on bottom land, and can be used in supplementary pastures.

Among the bur-clovers are many species differing in form, size, and spines, including some with smooth pods such as button-clover, snail-clover, and spineless bur-clover varieties. Since spiny varieties soon mix with smooth ones, there is little practical value in trying to maintain smooth forms unless their yield proves to be greater.

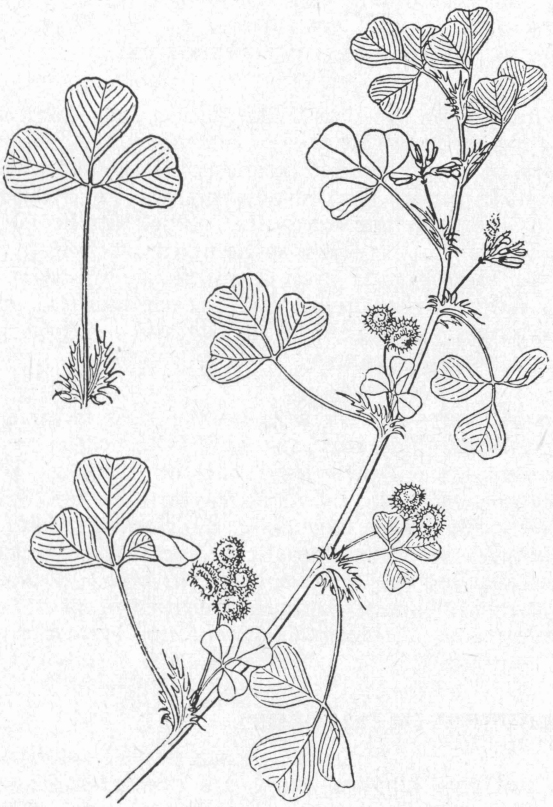
Spotted or Southern bur-clover (M. arabica) is readily known by the purple spot in the middle of each leaflet. The



Spotted bur-clover, showing the butterfly stipules at the base of leaf stem.

burs are larger and spines longer than on California bur-clover but smaller than on giant bur-clover varieties. Stipules at leaf-stem bases are like tiny butterfly wings edged with short, pointed lobes. Spotted bur-clover is more susceptible to leaf-spot disease but is more cold resistant than California bur-clover.

Little bur-clover (M. minima) is much like black medic before blooming, but its small yellow flower-clusters are quite unlike black medic's little balls of yellow flowers. It has very small and soft spiny burs and its velvet-like foliage is bluish-green. Little bur-clover has spread naturally throughout Central and North Texas blacklands, westward over the Grand Prairie and



California bur-clover showing stipules at leaf base deeply lobed and thread-like teeth between.

south to San Marcos, into the Edwards Plateau beyond Bandera and Kerrville, and gradually into low hard lands in the Rolling Plains. It is typically a winter-hardy annual legume ripening in late spring. This bur-clover deserves attention for use in perennial pastures as far west and north as the Rolling Plains. Little bur-clover has been found in Wheeler county. It is persistent and tenacious, but slow growth and small size limit its suppression of grass. Commercial seed is not available.

California bur-clover (M. hispida) can be identified by the stipules at its leafstem bases. The stipule wings are deeply notched and the narrow teeth between extend into slender points. Usually it is recognized by not having leaf spots and by its shorter-spined burs, intermediate in size between the two previously described, and its leaf tips are finely toothed. California bur-clover is well established on the better soils of all types in Central Texas, excepting coarse sand.

Black medic (M. lupulina), like alfalfa, is without spiny burs. The leaves are velvety-soft and bluish green like little bur-clover. Top clusters of single-seeded kidney-shaped pods are blackish when mature in June. The hop-clover-type yellow flower-heads are more cylindrical than globular. Black medic is usually an annual in Texas, but rarely, it is biennial. It is best adapted to alluvial soils, blacklands and limy, heavy uplands, enduring more cold than clovers generally, except little bur-clover. It is valuable in pastures, and on fertile bottoms it supplements Johnsongrass and Bermudagrass.

Alfalfa (M. sativa) seems to be the best legume for Texas irrigated pastures. It is very susceptible to cotton root rot. It is known by its purple flower and perennial roots. Without the purple flower, alfalfa may be known from sweet clover by the latter's sweet odor. Also, stipules at the base of alfalfa leaf-stems are the winged type characteristic of bur-clovers, while biennial sweetclover stipules are slender and awn-like. Where adapted, alfalfa is usually the most productive and the most palatable of all pasture legumes. It retains its succulence up to blooming time.

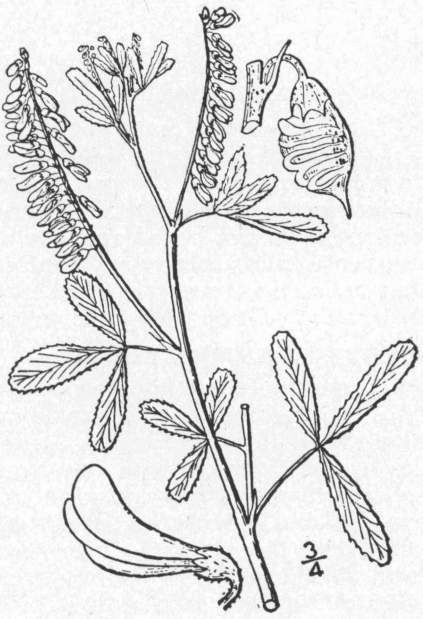
SWEETCLOVERS (MELILOTUS)

While not true clovers, there are among the sweetclovers, two annuals and two biennials important to Texas chiefly for soil improvement and supplemental pastures. They grow naturally from two to several feet tall, the biennials with large very deep roots. The coarse stems become woody and the foliage bitter

toward maturity. The small blooms are in spikes, white or yellow according to species.

Sweetclovers resemble alfalfa when not in bloom, but are known by the sweet odor and the two awn-like stipules at the base of leaf stems. Alfalfa stipules are wing-shaped, more like the bur-clover.

Biennial Sweetclovers seldom produce seed the first year. They commonly grow two seasons before maturing seed. They may mature in one season from early fall planting and remain later in the season than annuals. Sweetclovers grow on almost all limy soils of good fertility except deep sand. They are most valuable for grazing when sown with a small grain or in Johnsongrass pastures. Also, they are grown for hay.



Madrid sweet with laterial folds on the seed pod.

Madrid is the most popular variety of biennial yellow sweetclover (Melilotus officinalis). Its popularity is due to greater vigor, leafiness, seed production and finer stems. Madrid sweetclover will not cross with white sweetclover (Melilotus alba) strains such as Hubam.

Biennial sweetclovers are not so well adapted in southern areas of Texas as the winter annuals. This is due to the long, hot, dry summers and to cotton root rot.

Evergreen variety of biennial white sweetclover compares well with Madrid in yield and qualiey though not so fine stemmed. This variety blooms over a longer period of time than Madrid, and the harvesting of large seed yields is difficult because the seed shatter as they mature.

Hubam sweet clover with pineapple-like seed pod.

Hubam, (M. alba annua), is an annual form of white sweetclover. It is known from the biennial by its smaller roots and from sourclover, the yellow blossomed annual (M. indica) by the white flower. Hubam sweetclover is a fall-planted winter annual in the southern half of the state. In North Texas it is sown in the early spring. Hubam fits well with Johnsongrass and Rhodesgrass but it retards the grass growth more than the yellow annual.

Sourclover (Melilotus indica), the yellow blossom winter annual, is best adapted to mild winters. It is more bitter and less desired for grazing than other sweetclovers but once used to it, stock graze it well. Sourclover volunteers well from its many hard seed. Its great merit is early maturity in perennial pastures or supplemental pastures with small grain. In some locations seed can be harvested with the grain. Being upright, it harvests easier than vine legumes. It thrives on some of the less limy soils. As a green-manure crop, it makes enough growth early enough to turn under for cotton.

COOL WEATHER FAVORS CLOVER GERMINATION

Clovers generally are sown in middle to late fall. Lespedezas usually are sown in early spring. Ordinarily clover seeds do not germinate until cool nights alternate with warm days. Seeded too early in the fall, young clover must compete with late growing mature grass. At this season, temperatures are high and drying is rapid. This destroys artificial inoculation. High temperatures favor damping-off organisms that destroy clover seedlings. Intermittent showers and sunshine and warm days are unfavorable to germinating seed and young seedlings. Cooler weather favors germination. In the late fall less soil moisture is used by old grass as it matures. By shading, this old grass reduces evaporation and cools the soil.

LIGHT GROUND COVER FAVORS CLOVER STAND

Clovers generally make better stands in short, thin turf or in crop residue, litter or trash than on bare ground, excepting

especially well-prepared seed beds. A straw mulch is valuable for dry weather plantings. Sweetclovers and bur-clovers do well also as winter cover-crops on firm but not crusted soil of bare fields.

Winter clovers and summer lespedezas together in pastures are competetive. Rank-growing spring clover smothers germinating lespedeza. Bermudagrass and lespedeza are adapted to drouthy hills in East Texas. Dallisgrass, Bermudagrass and white clover or hop clover favor the moister lowlands. Lespedezas should be planted separately wherever clover is too abundant. In any case, dense grass and weeds must be closely mowed or grazed to favor clover germination and growth.

CLOVERS FAIL ON COARSE SANDS, WET LANDS AND ACID LANDS

The constant disappointment about clovers is their tendency to fail on deep coarse sand, poor land, wet land, acid land, or loose, dry soil of any kind. Clovers seem especially averse to any combination of these conditions. On practically all other types of soils having at least 25 inches average annual rainfall, some one or more of the clovers are adapted.

CLOVERS CAN'T STAND WET FEET

Land remaining soggy-wet in winter is lifeless, cold and without sufficient soil-air. For satisfactory crop growth all such wet land must be drained. This may include open flatwoods, flat coastal prairies, some stream-bottom land, and even sandy upland of tight subsoil within heavy winter-rainfall regions. Surface run-off water is carried away generally by natural slopes and draws, by road-side ditches, and, in much flat country, also by special drain ditches with laterals. In some places additional drainage is needed to aerate and warm the soil for earlier and better winter growth of clovers.

PASTURE DRAINAGE

Excess water from higher land may be conducted away by diversion ditches. Drainage of pasture land need not be started without adequate outlet ditches that will carry away at least 3 inches of water in 24 hours from 320 acres.

Locate drainage ditches in middle of broad, low, natural drainage ways or shallow swales. Double, parallel ditches, with low ridge between, is made by spoil dirt from both ditches being graded to the middle. This may be used as a trail or roadway.

A V-type ditch may be used between low places where a considerable cut must be made.

Corrugated lands, 50 feet wide, are effective on poorly drained land. The open dead furrows or graded middles open into drainage outlets. Where these corrugated lands are graded, the dirt must be carried full half-way between middles. Small knolls and buffalo wallow depressions can be smoothed by the grading. Because of carrying this dirt, it is less expensive to make narrow lands.

FERTILIZERS ARE NEEDED ON POOR SOIL

Clovers require large quantities of phosphate and potash. This is indicated by the following data:

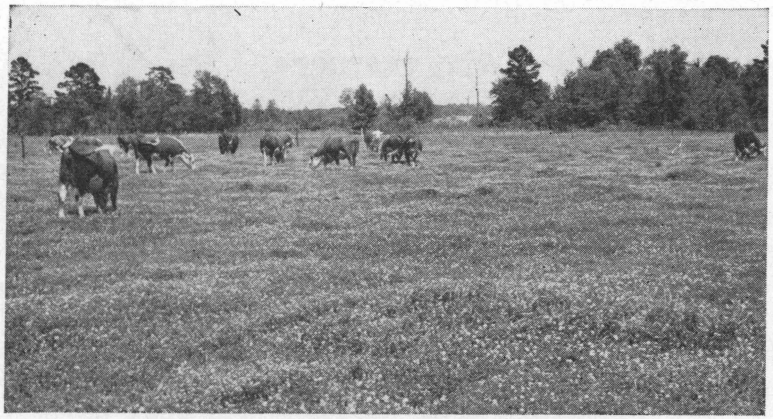
	Yield	Protein Produced	Minerals Removed	
			Phosphoric acid	Potash
Alfalfa	2½ tons	735 lbs.	24 lbs.	121 lbs.
Sweetclover	2½ tons	700 lbs.	21 lbs.	107 lbs.
White clover	1½ tons	540 lbs.	20 lbs.	60 lbs.

Superphosphate is essential for legumes on most soils in the state where average annual rainfall is above 25 inches and on many sandy soils of areas between 20 and 25. The Gulf Coast Prairie and East Texas are especially deficient in phosphorus. Potash, in addition to phosphate, is needed in sandy soils of those regions, especially on wornout fields.

Dark, heavy prairies, valleys and bottoms generally respond well to phosphate but are less likely to need potash. Fertilizers for the first clover planting may include nitrogen with phosphate such as 30-60-0. Old field land may need 30-60-30 to start legumes. Maintenance may call for 0-30-0 annually. (These fertilizer rates are expressed in pounds of nutrients per acre. The 30-60-0 would be obtained from 300 pounds of 10-20-0 fertilizer or a combination of 100 pounds of ammonium nitrate and 300 pounds of 20 per cent superphosphate. The 30-60-30 would be contained in 300 pounds of 10-20-10 fertilizer or its equivalent, and the 0-30-0 could be obtained from 150 pounds of 20 per cent superphosphate or approximately 65 pounds of 45 per cent triple-superphosphate.)

Sandy land of the Gulf Coast and East Texas Uplands generally responds to both phosphate and potash. First plantings of legumes may also need some nitrogen. These situations indicate such fertilizer treatment as 30-60-60 for these areas and for the West Cross Timbers 15-60-30. Maintenance may require 0-30-0 annually.

The common recommended rate is 30 pounds P_2O_5 per acre per year. That is, 150 pounds of 20 per cent superphosphate per



Bottomland pasture in East Texas
(Courtesy Tex. Agr. Exp. Station)

acre for one year; 300 pounds for two years. The relative rates of P_2O_5 and potash should generally be a 1-1 or a 2-1 ratio. Less potash is likely to be needed in the West Cross Timbers.

Highly acid, heavy soil, (pH 6.0 or below) may need a ton of ground limestone per acre. Less may be needed on lighter soils. Blackland generally needs no potash or lime.

GET A STAND OF GRASS BEFORE SEEDING CLOVERS

In starting new perennial pastures of grass and clover, the clovers should be seeded after the base grass becomes well enough established to withstand competition the next fall or a year later. In any area, these base grasses are the best-adapted perennial grasses. They are the foundation upon which a pasture is built. For example, Bermudagrass is the most dependable base grass for Central and East Texas down to the Gulf Coast, and it is associated with Dallisgrass on the more productive soils. Buffalograss is a base grass for limy, tight fertile soils. Two exceptions may be cited to the general rule of planting grasses and legumes separately. Fall seeding of grasses and clovers together has proved satisfactory in the Gulf Coast and South Texas. Grasses and clovers may also be seeded together in irrigated pastures.

Choosing the right clover is highly important. If adaptability is not known, they should be tried in small patches before making extensive plantings. Generally clovers in pastures are limited to regions of 25 inches or more average rainfall, in irri-

gated areas, or to other locations where there are accumulations of moisture.

PREPARATION FOR NEW PASTURES

A complete fertilizer containing about 30-60-30 is required for starting new grasses on poor soil in humid regions. Afterward for clover, apply 0-60-30. A soil test will aid in determining fertilizer needs. On poor soils, legumes with fertilizers frequently should be used to build up the fertility and improve soil tilth to permit rapid establishment of the pasture.

Fertilizer materials containing phosphoric acid should be placed below the soil surface. On high-lime soils, they should be placed in bands below the surface. When superphosphate is applied on top of clay soil, it is not available to plant roots during most of the year. Both white clover and Bermudagrass spread by surface runners with shallow roots. They are able to take phosphoric acid at the soil surface when the soil is moist, but not when it is dry. It is when pastures are dry that phorphoric acid is more deficient.

Some land preparation may be required before seeding clovers. Sod land, particularly Bermudagrass should be disked, but not enough to destroy the sod or trash mulch. Too much old vegetation will require some of it being removed. Cultipacking before and after seeding, following disking, is important to press loose soil together, close air pockets and press upper soil into contact with moist soil. There is no substitute for a firm, moist seedbed. Clovers seldom survive in a deep, loose seedbed which

Red River bottom land pasture with white, persian, hop and black medic clovers

dries out quickly. The pasture rolling-cutter is excellent for areas where a cultipacker cannot be used. It also serves as a mower and is satisfactory for controlling brush.

INOCULATE ALL CLOVERS THOROUGHLY

Three times or more the commercially recommended rate of inoculation for clover seed assures much better stands the first year.

To inoculate clover seed:

(1) Fungicidal treatment before inoculation assures better germination.
(2) Mix seed with thin syrup until all are sticky.
(3) Give each kind of clover its particular inoculation separately and mix well.
(4) Add cottonseed meal until seeds separate.
(5) Keep inoculated seed shaded from sunlight.
(6) Plant as soon as possible.
(7) Cover inoculated seed as soon as it is sown.

Clover seeds requiring different inoculants must be treated separately to concentrate the right bacteria on its particular seed. The soil should be moist and well packed before seeding. Seed should be sown soon after inoculation to prevent drying or molds forming. Fungicidal treatment of clover seed will reduce damping off of seedlings and aid in obtaining stands. Plantings on dry soil will result in poor inoculation. Seed contact with moist soil affords bacteria protection.

Re-inoculate if dry weather follows the seeding. Clovers already planted may be re-inoculated as the seedlings break through the ground. For this treatment enough commercial inoculant for a bushel of seed is mixed with 50 to 60 pounds of moistened cottonseed meal, sand or stable-lot soil. This is broadcast over the field in rainy or cloudy weather so that sunshine will not kill the bacteria. This second treatment supplies living bacteria to the seedlings just when many young plants need it most.

CLOVER SEEDING RATES ARE VARIABLE

Seeding rates depend upon cost, variety, urgency for quick development, availability of seed, thoroughness of land preparation or certainty of adaptation. A thin stand of a well adapted variety would be expected to reproduce itself to a full stand within a few years by volunteering. Even so, after thorough and perhaps expensive preparation scant seeding may prove to be poor economy.

Conservative rates per acre for over-seeding well prepared pasture sod land under favorable conditions for each of the following:

Hop clover	1 lb.	Bur-clover (in bur)	12 (1 bu.)
White clover	2	Biennial sweetclover	6
Persian clover	2	Hubam sweetclover	6
Sourclover (M. indica)	4	Common lespedeza	6
Black medic	4	Tenn. 76 lespedeza	6
Alfalfa	1½-3	Korean lespedeza	8
Bur-clover (hulled)	5 lb.	Kobe lespedeza	8

For mixtures, the rates would be reduced proportionately. Considerably higher rates generally are used in seeding clover meadows or for pure stands on prepared ground. Land preparation, inoculation, fertilization, and moisture affect results much more than seeding rates.

Irrigated clovers should have enough moisture in the soil at the time of planting to get a stand rooted. Additional irrigations may be necessary to prevent drying and crusting, since continuous moisture during early growth is necessary.

Irrigated pastures require irrigation every 10 days to two weeks during dry, hot weather. Water moves slower over land covered with a well-managed pasture sod than over land in alfalfa or small grain, but it penetrates the sod-covered soil faster. For the sod area, therefore, relatively large heads of water are necessary to obtain quick coverage and efficient distribution of water.

Sow the seed with any kind of seeder or a grain drill with grass seed attachment, or by hand. Sow either broadcast or in rows. Seed and fertilizer can be applied at the same time if seed tubes are back of fertilizer tubes. Various makes of both picker wheel and cell drop type of cotton seed hoppers have proved satisfactory for planting trashy bur-clover burs. Planter box devices for regulating the rate of seeding hulled clover seed are available.

HARVESTING CLOVER SEED

Bees are essential for proper pollination of many clovers. Persian clover seems to be one of the exceptions. Lack of sufficient pollination lowers seed yields. A minimum of one hive of honey bees per acre of clover within one and one-half miles should assure good seed production.

Clovers mostly self-fertilized are: Bur-clover, black medic, sourclover, hop clovers, persian clover, sub clover, and lespedezas. Seed bearing in self-pollinated clovers is less affected by

weather conditions and the absence or scarcity of beneficial insects.

Clovers mostly cross-fertilized are: Alfalfa, sweetclovers, alsike clover, red clover, and white clover. After the flowers are open, pollination generally is done by visiting insects seeking nectar and pollen. This must occur within three to five days; otherwise seed will not likely be formed.

A very satisfactory method of harvesting white, hop and persian clovers is cutting with the mower when the seed is mature but before shattering starts, using a buncher attached to the cutter-bar. Rake at once with side delivery rake if buncher is not used. A dump-rake is not as good but may be used if dumps are light. Cure clover in the windrow, turning if it gets wet. In two to three days it should be ready to thresh.

The windrow may be picked up with a combine equipped with a pick-up attachment. Hold down speed of machine and wind to prevent blowing away the seed. A clover huller or threshing machine with the huller attachments can be used. The clover, in this case, is hauled from windrows to the thresher. The thresher should be set to prevent too much seed being blown over. This will usually leave trash in the seed. Trashy seed may be recleaned. White clover can be handled from the swath with a pick-up combine but there is some loss of seed.

The simplest method of saving seed is in the hay. The crop is handled as above for threshing, using either kind of rake or buncher and then at once, while tough, it is hauled and scattered as thinly as possible over land where a stand is desired. It

Experimental pastures at the Lufkin station
(Courtesy Tex. Agr. Exp. Station)

can be scattered as sparsely as is necessary but should be strung out over the field so that it can spread in growth and soon make a stand. Also the hay can be cured and stored in the barn for spreading in the early fall.

Bur-clover seed is swept from the ground after burs and vines are dry. Vines may be gathered with a dump rake or hand rake with or without mowing, and swept up with stiff brooms when pods are thoroughly dry. A suction-type harvester is commercially available.

NUMBER OF CLOVER SEED PER POUND

Hop clover	1,000,000	Little bur-clover	400,000
White clover	800,000	Bur-clover in bur	67,000
Alsike clover	700,000	Alfalfa	200,000
Persian clover	675,000	Common lespedeza	310,000
Black medic	300,000	Tenn. 76 lespedeza	310,000
Sweetclover	260,000	Kobe lespedeza	190,000
California bur-clover	140,000	Korean lespedeza	225,000
Spotted bur-clover (hulled)	210,000		

AVOIDING BLOAT

Close grazing and feeding hay or plenty of grass should prevent bloating. Fibrous roughage is needed to stimulate normal paunch action. Muscular contraction of the paunch forms the cud and belches out the gas. A good fill of coarse, dry hay, grass pasturage or silage is the most effective preventive to bloating on pastures which are succulent. Sudan grass or other sorghum hay is ideal.

Lush growth of pasture clovers must not be allowed too much ahead of grazing. Dividing pastures into smaller units and stocking them heavily, one at a time in rotation, to obtain close and even grazing is good management. Excess growth in pastures should be harvested for hay or silage.

White clover and Dallisgrass pasture on the Texas Gulf Coast
(Courtesy Tex. Agr. Exp. Station)

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*Alluvial river soils are not included as part of the true Gulf Coastal Prairie soil regions.

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